

METHODOLOGY

OVERVIEW

The Puget Sound Council of Governments' Transportation Panel, Wave 6 consisted of two field components and two data entry components. The field components included: 1) recontacting Wave 5 participants in order to include them in Wave 6, and 2) recruiting new participants to replace Wave 5 participants who fell out for various reasons. The data entry components included 1) data entry of diaries collected from new and continuing panel members and 2) data entry of attitude surveys for each individual in the panel.

The basic procedures for the field components were as follows:

Recruitment of new Wave 6 participants

1. Conduct telephone survey and recruitment from sample of randomly generated numbers.
2. Recruit additional numbers of bus riders, car-poolers and newcomers to the 4 county area using lists provided PSRC.
3. Mail diary packets.
4. Re-contact households not returning diaries by telephone.
5. Re-mail diary packets to those requiring them.

Continuing Panel Members

1. Wave 5 panel members were contacted by mail to determine interest in continuing (This was completed by PSRC prior to the contract start date).
2. Split Wave 5 into 4 groups to distribute telephone effort.
3. Mail diary packets.
4. Contact by telephone after packet is received but before diary dates.
5. From telephone interviews, determine which households have additions. Mail new diaries to additions to panel
6. Re-contact households not returning diaries by telephone.
7. Re-mail diary packets to those requiring them.

The Wave 5 panel members were contacted by telephone in order to use personal contact as a motivating force for continued participation in the panel. The mailing and telephone contact were timed so that most members would receive a telephone call within 2 days before or after receiving the materials in the mail. The panel members were separated into four groups in order to spread out the effort and make this close timing possible.

In previous waves, post cards were mailed as a reminder to return diaries. This step was replaced in Wave 6 by telephone calls. Telephone calls are more effective because of individuals who lose / misplaced / dispose of the diaries or who miss their assigned dates and believe that they can no longer participate.

The basic procedures for the data entry components were as follows:

Diary data entry

1. Scan diaries as received for major problems. Flag problem diaries.
2. Enter diary data as diaries are received. Flag problem diaries.
3. To the extent that is possible, correct problems on diaries.
4. Re-contact households to clarify diaries, obtain missing data, identify addresses for place names, etc.
5. Re-enter/check diary data.

Attitude data entry

1. Standard double entry keypunching (all diaries keypunched twice).

The attitude survey involves standard data entry procedures. Complete double entry verification was used.

The diary data entry is anything but standard. The first entry functions to identify errors made by the respondents in filling out the diaries. After identifying problem diaries, an attempt is made to correct the diary in-house. If this is not possible (by cross checking the diary with other diaries in the household, looking up addresses for buildings, businesses, etc.), panel members are called to correct the data.

CONTACT OF WAVE 5 PANEL MEMBERS FOR WAVE 6

In order to allow time to contact continuing households by telephone within days of mailing out their packets, the sample was split into four groups according to their diary days (Monday/Tuesday, Tuesday/Wednesday, Wednesday/Thursday, Thursday/Friday).

Mailout of packets

The mailout used identical materials (except for an updated cover letter) to those used in Wave 5. Samples of these materials are included in the Appendix. The packet mailed to each household consisted of the following:

1. Cover letter
2. Example diary for specific county
3. Instruction sheet
4. Postage paid return envelope
5. A crisp new two dollar bill for each member of the household filling out a diary
6. Two travel diaries for each household member with “right/wrong” examples on the back

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The packet was mailed in an oversized envelope addressed to the household contact. For postage first class colorful, large stamps were used. The cover letter was on PSRC letterhead and personalized with the household contact's name in the salutation and with the current date. The signature was Neil Kilgren's (scanned onto the letter).

The sample diary was printed on pale colored paper with "SAMPLE" screened across it. For each of the four counties, a separate diary was printed with examples specific to that county and each county was color coded for easier assembly of the mailout packet.

The instruction sheet was printed as a double-sided piece with instructions broken out in categories corresponding to the sections of the diaries. Boxes were used to enclose the major sections just as in the diaries and graphical elements were used to add interest to the instructions

Each household member participating in the survey received 2 diaries and a crisp \$2 bill. A colored paperclip fastened the 3 items together. Each diary was personalized with the member's name, the date the diary was to be filled out, their identification numbers (household-id, sub-id, person-id) and telephone number.

Telephone contact

The mailings were orchestrated such that the assigned diary dates were 6 days after the mailing date, or about 4 days after the household's receipt of the diaries. Two days following the mailout, telephone calls were made to each household. (See schedule below.) The objective of this telephone contact was to:

1. Update the household information
2. Determine if packet was received
3. Determine if replacement or additional diaries were required
4. Personalize the study by adding warmth and intensity
5. Motivate continued participation by conveying the importance of participation
6. Convey the importance of all household members participating and collecting information on the same dates
7. Create a sense of urgency for the target days
8. Provide clarification of procedures / explanations and answers questions
9. Verify the validity of the telephone numbers from Wave 5

Since not all households could be contacted immediately, telephone calls were made after the diary dates and even after diaries were received, in order to update the household information.

These contacts were fruitful in determining who had not received packets due to address changes, who had not even opened their mail yet, who had already lost the packets, who needed extra diaries (and \$2 bills) for additional panel members in the household. New

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packets were sent to 292 households. The majority of these mailings were a result of these phone contacts. (The rest were because panel members called in and asked for new sets or they were asked to re-do their diaries because they returned them blank because they had been on vacation, out of the 4 county area, or said that they “don’t drive anywhere.”)

Follow-up telephone contact

In previous waves, a post-card was mailed to remind panel members to return diaries. This was dropped in favor of telephone contact only in order to provide a stronger motivation and identify replacement needs. Follow-up calls began about 10 days after the diary date. These follow-up calls were repeated for households which did not respond by sending in their diaries.

The follow-up calls proved to be valuable. For a variety of reasons, many households (178) requested replacement diaries. Other households needed to be instructed that they could still participated although they had missed the dates printed on the diaries.

Schedule for mailout

The following table shows the schedule for all of the above activities.

SCHEDULE FOR CONTINUING HOUSEHOLDS

Group Number	1	2	3	4
Mailout Date	5/28	5/29	5/30	5/31
Diary Date 1	6/3	6/4	6/5	6/6
Diary Date 2	6/4	6/5	6/6	6/7
Diary Weekday 1	Mon	Tues	Wed	Thurs
Diary Weekday 2	Tues	Wed	Thurs	En
Telephone Update Begins	5/30	5/31	6/1	6/2
Telephone Follow-up Begins	6/10	6/10	6/10	6/10
Telephone Follow-up Ends	7/17	7/17	7/17	7/17

RECRUITMENT OF REPLACEMENT PANEL MEMBERS FOR WAVE 6

Recruitment of new panel members included the following steps:

1. The recruitment was based upon randomly generated telephone numbers for prefixes within the four counties.
2. A telephone interview was conducted to obtain the household and person information as well as to ask respondents to participate.
3. Additional effort was made to obtain an increased representation of newcomers, bus riders and car-poolers.
 - a) Newcomers list was obtained by PSRC from the new vehicle license holders
 - b) PSRC provided names of bus riders and car-poolers willing to participate.
4. Packets were mailed one day following the telephone interview.
5. Follow-up telephone calls were made as necessary.

Randomly generated sample

Recruits were selected from the 4 county area using computer generated random telephone numbers. Fourteen percent of the randomly generated numbers were invalid. Of those individuals actually contacted, 61% agreed to be interviewed. Of those who were asked to participate in the panel, 67% agreed to participate. Of these, 69% returned diaries.

Newcomers

Newcomers were recruited from a Department of Licensing list provided by PSRC. The list was comprised of 1550 names. These names/addresses were sent to the US West directory service which found telephone numbers for 543 records. The reasons for the difficulty in finding telephone numbers, in addition to having move out of state and having unlisted telephone numbers, includes many cases in which the individual's telephone number is listed under a different person's name (husband, father and mother, roommate, etc.).

Of the 543 telephone numbers, interviews were conducted with 119 individuals. Of these, 71 agreed to participate in the study. The remaining 424 numbers resulted in dead-ends for a variety of reasons: the individual had moved, the number was incorrect to begin with, the number was no longer in service, the individual did not meet the criterion for newcomer, etc.

Despite the low success rate (8%) in locating newcomers from the Department of Licensing list, the success rate was still much better than the success rate from random recruiting (0.2% to 0.5%).

DIARY DATA ENTRY

Typically, survey data collection and data entry are sequential rather than simultaneous tasks. Following data collection, it is usual to have a trained employee review the completed interview data for completeness and clarity and correct the data as required. The verified surveys are then submitted for data entry when fielding is complete. This procedure was found not to work well for travel diaries.

The travel diary is characterized by a high level of erroneous data. The high error rate was documented in the Wave 5 Transportation Panel report. Approximately half of all diaries needed corrections in Wave 5 and Wave 6 diaries appeared to be no different.

The reasons for the high error rate can be attributed to the nature of the data (addresses themselves are complex), to the difficulty of the task being asked of respondents (i.e., asking respondents to carry the diaries with them and conscientiously record all trips) and to the respondents often not knowing the information being sought (i.e., addresses).

The need to correct so much of the diary data forces the data entry process to be an interactive one. Our procedure was as follows.

- 1) As the diaries were received, they were sorted and logged in. This information was used to recontact individuals who had not returned diaries.
- 2) Diaries were scanned, checking for completeness of all answers, especially addresses, by a full time project supervisor. There was also some attempt to see if the overall diary “made sense” and if the household’s diaries were consistent, although previous experience had shown that many of the more subtle mistakes are missed by “scanning” the diaries.
- 3) Diaries were then separated into four batches:
 - a) those which looked valid,
 - b) those with problems which could be solved in-house (a diary with a missing location which might be found in the telephone book, such as the name of a restaurant in a small town),
 - c) those which required a call back, and
 - d) those requiring a new set of diaries.
- 4) Corrections were attempted with those diaries from the second batch. Those which could not be corrected were put into batch C while those which were corrected were added to batch A.
- 5) The apparently valid diaries were given to other personnel for immediate data entry. This data entry step occurred during the fielding period. The reason for this is that previous experience had shown a significant number of “logic” errors were discovered only during the detailed data entry process. Thus, problem diaries were identified quickly and re-contact was made with the panel member as soon as possible after receiving the diary.

Catching inconsistencies between trips or diaries requires that the researcher read and

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understand the whole day's diary and the whole household's set of diaries. This is necessarily done as a part of the data entry. It would not be cost effective to duplicate this effort at the check-in stage, even though check in was done by experienced individuals. Because the "data entry" step is really a combination of verification and data entry, it must be done immediately so that panel members can be recontacted to clarify and/or provide missing data before too much time passes since the event.

Diary data were entered directly from the diary forms rather than from a "coding sheet." Not only would transcription be extremely inefficient, but one would lose the context which was very important in finding errors.

Problems Encountered with Diary Data

Problems that the panel members had in filling out the diaries could be classified into four categories:

1. trips do not make sense
2. incomplete location information
3. inclusion of inappropriate trips
4. inclusion of out of area trips

Trips do not make sense

Quite a variety of errors were detected simply because they were internally inconsistent or illogical. These ranged from simple to complex. Some simple problems included circling both "driver" and "rider", forgetting to include a starting location or putting the starting location on line 2, and forgetting to add the final return home. The more complex problems involved the relationships between distance and time, relationships between trips and so on. For example, sometimes the respondent would enter the time spent at a location (i.e., the arrival and departure time at the destination). This could be detected if the time was significantly too long for the trip.

Another common problem was circling the wrong time of day (am/pm). This could generally be figured out from the times of other trips. Occasionally, respondents would list trips in the wrong order (many of these diaries are apparently filled out at the end of the day rather than when the trips are actually made) so that the sequence of trips did not make sense.

In many instances missing trips or trips out of order were detected because of the inconsistency in the number of passengers or the relationships of passengers from trip to trip or the mode of transportation used on successive trips. For example, diaries implying that a car was abandoned, that an individual walked home from a very long distance, or that a child reappeared at an inappropriate time or place, all gave rise to suspect trip sequences. Other problems were detected by comparison of the diaries of different persons within the household.

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This usually involved trips recorded by one individual and not by another although sometimes it was more complicated than this.

Respondents were called in order to make corrections to the diaries if necessary although in many cases (about 2/3 of the diaries with problems) the diaries could be corrected without calling the respondents.

PROBLEM	SOLUTION
Forgot trip home at the end of the day.	Added with as much information as possible only if it was obviously correct
One member neglects to enter trip that other members included.	Used information from other members. Called if necessary.
Entered time spent at place rather than time in transit,	Attempted to figure out times. Called if necessary.
Sequence of trips doesn't make sense.	Called person to straighten out.
Number of individuals on trip doesn't make sense.	Tried to figure out from other information. Called if necessary.
Circled both D and R (driver and rider).	Tried to figure out from other information. Called if necessary.
Neglected to enter "Why?"	Tried to figure out from other information Called if necessary.

Incomplete location in formation

Many problems were found in the diaries when the trip information was being entered, and these problems were usually solved. If there was a non-distinctive place listed, such as "Mercer Island" or "friend's house," the panel member who filled out the diary was called to obtain a more complete location. In the case of a non-distinctive place and one street name ("McDonald's on Bellevue Way"), the address was looked up in the computer list or telephone book. If a place name and city, such as "Azteca Restaurant, Kirkland" were given, the address was also looked up in the phone book. When the "Address where started" box was left blank, other trips were checked to see if the person started at home and if there was a home address on the diary. Occasionally, times started and/or arrived were missing from some trips data and were reconstructed if possible. Otherwise, the person was called to get the missing times which were then entered if they were remembered or left blank if the person could not remember.

Locations were considered acceptable if they were unique. For example, we accepted place names of schools, colleges, shopping centers or malls, post offices in a small towns, and names of a large buildings. If the trip was to a location outside of the 4 county area, the name of the city, without an address, was accepted.

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PROBLEM	SOLUTION
Non-distinctive place and incomplete address or absence of address.	Called person to get address or intersection.
Place name and incomplete address or absence of address.	Looked up in the phone book
“Address Where Started” left blank	Checked other trips to see if they started at home.
Neglected to enter times.	Reconstructed if possible. Otherwise, called person to get times. If they could not remember, times were left blank.

Inclusion of inappropriate trips

In some cases trips listed on the diaries were deleted. Trips for walking for exercise or walking the dog were excluded. A walk to the nearest bus stop that was 5 minutes or less was also excluded. Where bus transfers were listed as separate trips, those trips were condensed into one trip with the appropriate total time spent in transit. Individual trips to different stores within one mall were entered as one trip. If the home address was entered as the first trip, the diary was straightened out so that all information for one trip was on the same line.

PROBLEM	SOLUTION
Walk to the nearest bus stop (5 minutes or less).	Did not record as a trip.
Walk for exercise / walk the dog.	Did not record as a trip.
Transfers on bus listed as separate trips.	Recorded all transfers to one destination as one trip.
Entered home as entry of first trip, causing aspects of one trip to be on two lines.	Straightened out trips.
Individual trips to different stores in one mall listed as separate trips.	Entered as only one trip.

Out of area trips

At the beginning of the project, if a person returned diaries for only one day or left them blank because they were out of town, they were asked to complete another two days on their assigned days of the week. Replacement packets were then sent out immediately. Near the end of the project, due to time constraints, panel members were only asked to do more diaries if they were out of town on both of the original days assigned to them (the one out of town day was accepted). In all cases, respondents who were out of the 4 county area for both assigned days were asked to redo both diaries. When trips were listed on a diary that were out of the 4 county area, only the trip that took the person out of the area and the trip that brought the person back into the 4 county area were recorded. The trips that started

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from and ended within counties other than King, Pierce, Snohomish and Kitsap were excluded.

PROBLEM	SOLUTION
Out of 4 county area on two days.	Asked to redo on two days within the area.
Out of 4 county area on one day.	Asked to redo 2 days within area. (At end of project one day in area was accepted.)
Trips outside the 4 county area	Only recorded the trips that took them out of the area and then back into the area. Only required the name of city or county outside of the 4-county area.

Verification of data entry

After all diaries had been entered, the diaries were verified for correctness and consistency. Each diary was checked against the information that had previously been entered into the computer. This step was primarily to correct “keying” errors rather than data recording errors made by the respondents. Most of the errors in the original data entry were incorrect spellings due to the poor handwriting on the diaries.

This verification step also ensured that information from the diaries was interpreted consistently into the appropriate codes. For example, a panel member may have put “School” in the “Why?” column, so the information was originally coded as “3 - School.” However, by reviewing the diary more closely, it could be seen that this person was not really going to school, but dropping off children at school and the coding should really be “6 - Personal.”

RESULTS

Continuing Households

A total of 1,259 households were verified. Of these, 1,089 returned diaries. The mode classification and county of the households are shown below. The proportion of households classified as SOV, bus riders, carpoolers and bus/carpoolers was 63.7%, 8.6%, 20.4% and 7.3%, respectively, among those returning diaries. The corresponding percentages for those who did not return them were 53.2%, 12.3%, 26.9% and 7.6%, respectively.

Returned Diaries	KING	KITSAP	PIERCE	SNOHO-MISH	TOTAL
SOV	319	75	139	159	692
BUS	61	13	9	10	93
CARPOOL	90	24	51	57	222
BUS& CARPOOL	38	8	11	22	79

Did not return diaries	KING	KITSAP	PIERCE	SNOHO-MISH	TOTAL
SOV	41	10	19	21	91
BUS	10	3	4	4	21
CARPOOL	17	4	11	14	46
BUS & CARPOOL	8	2	3	0	13

Recruits

A total of 1,403 new households were interviewed. Of these, 946 agreed to have the household participate in the panel. From the 946, 651 returned diaries sufficiently complete to use.

Households interviewed	1403
Households agreeing to participate	946
Households returning diaries	651

The mode distributions of these groups is shown in the tables below. In the final sample of those who returned diaries, 61.0% of the households were classified as SOV, 24.0% bus riders, 9.7% as carpoolers and 5.4% as both bus and carpoolers. The county distribution of the households returning diaries was 346, 51, 132 and 122 (53.1%, 7.8%, 20.3%, 18.7%) for King, Kitsap, Pierce and Snohomish counties, respectively.

Returned Diaries	KING	KITSAP	PIERCE	SNOHOMISH	TOTAL
SOV	203	28	81	85	397
BUS	106	13	20	17	156
CARPOOL	18	7	23	15	63
BUS & CARPOOL	19	3	8	5	35

The mode distribution for those who agreed to participate but who did not return diaries is shown in the following table. The mode percentages were 57.3%, 21.4%, 15.3% and 6.1% for households classified as SOV, bus riders, carpoolers and bus & carpool, respectively. The percentage of HOV travelers, especially carpoolers, was somewhat higher among these individuals who did not return diaries.

Recruited but did not return diaries	KING	KITSAP	PIERCE	SNOHOMISH	TOTAL
SOV	73	16	39	41	169
BUS	33	8	9	13	63
CARPOOL	17	2	19	7	45
BUS & CARPOOL	3	5	7	3	18

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The mode distribution for those who refused to participate is shown in the next table. The mode distribution was 42.9%, 9.0%, 27.1% and 21%, respectively. Thus, this also indicates a lower participation rate from HOV households.

Refused to participate	KING	KITSAP	PIERCE	SNOHO-MISH	TOTAL
SOV	73	16	39	41	169
BUS	33	8	9	13	63
CARPOOL	17	2	19	7	45
BUS & CARPOOL	3	5	7	3	18

A total of 113 newcomers (individuals who had lived in the 4 county area for less than 1 year) were interviewed. Of these, 71 agreed to participate. Despite repeated encouragement to return the diaries, only 55 did so.

Newcomer households interviewed	113
Newcomer households agreeing to participate	71
Newcomer households returning diaries	55